QNAP Turbo NAS

Hardware User Manual

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Thank you for choosing QNAP products! This user manual provides description of the hardware of the Turbo NAS and relevant guideline of certain functions. Please read carefully and strictly adhere to the instructions of the manual.

This user manual is applicable to the following Turbo NAS models:
TS-112, TS-212, TS-412, TS-412U, TS-119P II, TS-219P II, TS-419P II, TS-419U II, TS-459 Pro II, TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-1279U-RP, TS-EC879U-RP, TS-EC1279U-RP, TS-1679U-RP, TS-EC1679U-RP, TS-269 Pro, TS-469 Pro, TS-569 Pro, TS-669 Pro, TS-869 Pro, TS-469U-RP/SP, TS-869U-RP, TS-1269U-RP, TS-269L, TS-469L, TS-569L, TS-669L, TS-869L, TS-870U-RP, TS-1270U-RP.

NOTE

- The "Turbo NAS" is hereafter referred to as "NAS".
- The product you purchased may not support certain functions dedicated to specific models.
- All features, functionality, and other product specifications are subject to change without prior notice or obligation.
- Information presented is subject to change without notice.
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Note:

1. Back up your system periodically to avoid any potential data loss. QNAP disclaims any responsibility of all sorts of data loss or recovery.
2. Should you return any components of the NAS package for refund or maintenance, make sure they are carefully packed for shipping. Any form of damages due to improper packaging will not be compensated.

Regulatory Notice

FCC STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Shielded interface cables, if any, must be used in order to comply with the emission limits.

CE NOTICE

Class B only.

Symbols in this document

Warning	This icon indicates the instructions must be strictly followed. Failure to do so could result in injury to human body or death.
Caution	This icon indicates the action may lead to disk clearance or loss OR failure to follow the instructions could result in data damage, disk damage, or product damage.

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Safety Warnings

1. The NAS can operate normally in the temperature of 0ºC–40ºC and relative humidity of 0%–95%. Please make sure the environment is well-ventilated.
2. The power cord and devices connected to the NAS must provide correct supply voltage (100W, 90–264V).
3. Do not place the NAS in direct sunlight or near chemicals. Make sure the temperature and humidity of the environment are in optimized level.
4. Unplug the power cord and all connected cables before cleaning. Wipe the NAS with a dry towel. Do not use chemical or aerosol to clean the NAS.
5. Do not place any objects on the NAS for the server's normal operation and to avoid overheat.
6. Use the flat head screws in the product package to lock the hard disks in the NAS when installing hard disks for proper operation.
7. Do not place the NAS near any liquid.
8. Do not place the NAS on any uneven surface to avoid falling off and damage.
9. Make sure the voltage is correct in the location where the NAS is installed. Contact the distributor or the local power supply company for the information.
10. Do not place any object on the power cord.
11. Do not attempt to repair the NAS in any occasions. Improper disassembly of the product may expose the users to electric shock or other risks. For any enquiries, please contact the distributor.
12. The chassis NAS models should only be installed in the server room and maintained by the authorized server manager or IT administrator. The server room is locked by key or keycard access and only certified staff is allowed to enter the server room.

Warning:

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Do NOT touch the fan inside the system to avoid serious injuries.

Chapter 1. CPU and Memory Specifications

Caution: Modifying the hardware, software, or firmware of the QNAP products will void the warranty. QNAP is not responsible for any form of damage or loss of data caused by modding the QNAP products. Users should bear their own risks of all sorts of possible data loss or system instabilities due to changing the hardware parts, modifying the default system firmware or installing any unauthorized third party applications on QNAP products.

System	**TS-112**	**TS-212**
CPU	Marvell 1.2GHz	Marvell 1.2GHz
Memory	256MB DDR2	256MB DDR2□
Flash	16MB	16MB
CPU replaceable	No	No
Memory replaceable	No	No
Number of SODIMM slots	0	0
Number of hard drive slots	1	2

System	**TS-412**	**TS-412U**
CPU	Marvell 1.2GHz	Marvell 1.2GHz
Memory	256MB DDR2	256MB DDR2
Flash	16MB	16MB
CPU replaceable	No	No
Memory replaceable	No	No
Number of SODIMM slots	0	0
Number of hard drive slots	4	4

System	TS-119P II	TS-219P II	TS-419P II, TS-419U II
CPU	Marvell 2.0GHz	Marvell 2.0GHz	Marvell 2.0GHz
Memory	512MB DDR3	512MB DDR3	512MB DDR3
Flash	16MB	16MB	16MB
CPU replaceable	No	No	No
Memory replaceable	No	No	No
Number of SODIMM slots	0	0	0
Number of hard drive slots	1	2	4

System	TS-459 Pro II
CPU	Dual-core Intel® Atom™ processor (1.80 GHz)
Memory	1GB DDR3 (Expandable RAM, up to 3GB)
Flash	512MB (USB DOM)
CPU replaceable	No
Memory replaceable	Compatible with DDR3 800 DRAM
Number of SODIMM slots	2
Number of hard drive slots	4

System	TS-879 Pro	TS-1079 Pro	TS-879U-RP
CPU	Intel® Core i3 Dual Core (3.30 GHz)	Intel® Core i3 Dual Core (3.30 GHz)	Intel® Core i3 Dual Core (3.30 GHz)
Memory	2GB DDR3 RAM	2GB DDR3 RAM	4GB DDR3 RAM
Flash	512MB (USB DOM)	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No	No
Memory replaceable	No	No	Yes
Number of LONG-DIMM slot	2	2	4
Number of hard drive slots	8	10	8
Number of expansion slots	1	1	2

System	TS-1279U-RP	TS-EC879U-RP	TS-EC1279U-RP
CPU	Intel® Core i3 Dual Core (3.30 GHz)	Intel® Xeon Quad Core (3.20 GHz)	Intel® Xeon Quad Core (3.20 GHz)
Memory	4GB DDR3 RAM	4GB DDR3 ECC RAM	4GB DDR3 ECC RAM
Flash	512MB (USB DOM)	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No	No
Memory replaceable	Yes	Yes	Yes
Number of LONG-DIMM slot	4	4	4
Number of hard drive slots	12	8	12
Number of expansion slots	2	2	2

System	TS-1679U-RP	TS-EC1679U-RP
CPU	Intel® Core i3 Dual Core (3.30 GHz)	Intel® Xeon Quad Core (3.20 GHz)
Memory	4GB DDR3 RAM	4GB DDR3 ECC RAM
Flash	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No
Memory replaceable	Yes	Yes
Number of LONG-DIMM slot	4	4
Number of hard drive slots	16	16
Number of expansion slots	2	2

System	TS-269 Pro	TS-469 Pro	TS-569 Pro
CPU	Dual-core Intel® Atom™ processor (2.13 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)
Memory	1GB DDR3 (Expandable RAM, up to 3GB)	1GB DDR3 (Expandable RAM, up to 3GB)	1GB DDR3 (Expandable RAM, up to 3GB)
Flash	512MB (USB DOM)	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No	No
Memory replaceable	Compatible with DDR3 1066 DRAM	Compatible with DDR3 1066 DRAM	Compatible with DDR3 1066 DRAM
Number of SODIMM slots	2	2	2
Number of hard drive slots	2	4	5

System	TS-669 Pro	TS-869 Pro
CPU	Dual-core Intel® Atom™ processor (2.13 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)
Memory	1GB DDR3 (Expandable RAM, up to 3GB)	1GB DDR3 (Expandable RAM, up to 3GB)
Flash	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No
Memory replaceable	Compatible with DDR3 1066 DRAM	Compatible with DDR3 1066 DRAM
Number of SODIMM slots	2	2
Number of hard drive slots	6	8

System	TS-469U-RP/SP	TS-869U-RP	TS-1269U-RP
CPU	Dual-core Intel® Atom™ processor (2.13 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)
Memory	1GB DDR3 (Expandable RAM, up to 3GB)	2GB DDR3 (Expandable RAM, up to 4GB)	2GB DDR3 (Expandable RAM, up to 4GB)
Flash	512MB (USB DOM)	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No	No
Memory replaceable	Compatible with DDR3 1066 DRAM	Compatible with DDR3 1066 DRAM	Compatible with DDR3 1066 DRAM
Number of SODIMM slots	2	2	2
Number of hard drive slots	4	8	12

System	TS-269L	TS-469L	TS-569L
CPU	Dual-core Intel® Atom™ processor (1.86 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)
Memory	1GB DDR3 (Expandable RAM, up to 3GB)	1GB DDR3 (Expandable RAM, up to 3GB)	1GB DDR3 (Expandable RAM, up to 3GB)
Flash	512MB (USB DOM)	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No	No
Memory replaceable	Yes (DDR3-1066 SODIMM DRAM)	Yes (DDR3-1066 SODIMM DRAM)	Yes (DDR3-1066 SODIMM DRAM)
Number of SODIMM slots	2	2	2
Number of hard drive slots	2	4	5

System	TS-669L	TS-869L
CPU	Dual-core Intel® Atom™ processor (2.13 GHz)	Dual-core Intel® Atom™ processor (2.13 GHz)
Memory	1GB DDR3 (Expandable RAM, up to 3GB)	1GB DDR3 (Expandable RAM, up to 3GB)
Flash	512MB (USB DOM)	512MB (USB DOM)
CPU replaceable	No	No
Memory replaceable	Yes (DDR3-1066 SODIMM DRAM)	Yes (DDR3-1066 SODIMM DRAM)
Number of SODIMM slots	2	2
Number of hard drive slots	6	8

System	TS-870U-RP	TS-1270U-RP
CPU	Intel® Celeron® Processor 2.10 GHz	Intel® Celeron® Processor 2.10 GHz
Memory	4GB DDR3	4GB DDR3
Flash	512MB	512MB
CPU replaceable	No	No
Memory replaceable	Yes	Yes
Number of SODIMM slots	4	4
Number of hard drive slots	8	12

Chapter 2. Power Button and Reset Button Behavior

✓ Power button: Press to turn on or turn off.

System	Power button (Turn on)	Power button (Hardware turn off)	Power button (Force turn off)
All models	Press once	1.5 sec	5 sec

✓ Reset button: Press to reset the system settings.

System	Basic system reset (1 beep)	Advanced system reset (2 beeps)
All models	3 sec	10 sec

Basic system reset (3 sec)

Press the reset button for 3 seconds, a beep sound will be heard. The following settings are reset to default:

- System administration password: admin
- TCP/IP configuration: Obtain IP address settings automatically via DHCP
- TCP/IP configuration: Disable Jumbo Frame
- TCP/IP configuration: If port trunking is enabled (dual LAN models only), the port trunking mode will be reset to "Active Backup (Failover)".
- System Port: 8080 (system service port)
- Security Level: Low (Allow all connections)
- LCD panel password: (blank)*
- VLAN will be disabled

*This feature is only provided by the NAS models with LCD panels. Please visit http://www.qnap.com for details.

Advanced system reset (10 sec)

Press the reset button for 10 seconds; you will hear two beeps at the third and the tenth seconds. The NAS will reset all the system settings to default as it does by web-based system reset in "Administration" > "Restore to Factory Default" except all the data are reserved. The settings such as the users, user groups, and the network share folders previously created will be cleared. To retrieve the old data after the advanced system reset, create the same network share folders on the NAS and the data will be accessible again.

Chapter 3. USB One Touch Copy

System	Number of seconds (press the one touch copy button to trigger data copy)
All NAS models	0.5 sec

Data Copy by the Front USB Port

The NAS supports instant data copy backup from the external USB device to the NAS or the other way round by the front one touch copy button. To use this function, follow the steps below:

1. Make sure a hard drive is installed and formatted on the NAS. The default network share Qusb or Usb is created.
2. Turn on the NAS.
3. Configure the behavior of the Copy button on "Backup" > "USB one touch copy" page.
4. Connect the USB storage device to the front USB port of the NAS.
5. Press the Copy button. The USB LED will flash. The data will be copied to or from the USB device according to the NAS settings.

Note: This feature adopts incremental backup. After the first time data backup, the NAS only copies the changed files since the last backup.

Chapter 4. LED and Alarm Buzzer Specifications

The LED indicators of the NAS indicate the system status and information. When the NAS is turned on, check the following items to make sure the system status is normal. Note that the following LED information is applicable only when users have properly installed the hard drive, and connected the NAS to the network and the power supply.

LED	Color	LED Status	Description
System Status	Red/ Green	Flashes green and red alternately every 0.5 sec	1. The hard drive on the NAS is being formatted 2. The NAS is being initialized 3. The system firmware is being updated 4. RAID rebuilding is in process 5. Online RAID Capacity Expansion is in process 6. Online RAID Level Migration is in process
		Red	1. The hard drive is invalid 2. The disk volume has reached its full capacity 3. The disk volume is going to be full 4. The system fan is out of function 5. An error occurs when accessing (read/write) the disk data 6. A bad sector is detected on the hard drive 7. The NAS is in degraded read-only mode (2 member drives fail in a RAID 5 or RAID 6 configuration, the disk data can still be read) 8. Hardware self-test error
		Flashes red every 0.5 sec	The NAS is in degraded mode (one member drive fails in RAID 1, RAID 5 or RAID 6 configuration)
		Flashes green every 0.5 sec	1. The NAS is starting up 2. The NAS is not configured 3. A hard disk drive is not formatted
		Green	The NAS is ready
		Off	All the hard disk drives on the NAS are in standby mode

LAN	Orange	Orange	The NAS is connected to the network
		Flashes orange	The NAS is being accessed from the network
10 GbE[1]	Green	Green	The 10GbE network expansion card is installed
		Off	No 10GbE network expansion card is installed
HDD	Red/ Green	Flashes red	The disk data is being accessed and a read/write error occurs during the process
		Red	A hard disk drive read/write error occurs
		Flashes green	The disk data is being accessed
		Green	The hard disk drive can be accessed
USB	Blue	Flashes blue every 0.5 sec	1. A USB device (connected to the front USB port) is being detected 2. A USB device (connected to the front USB port) is being removed from the NAS 3. The USB device (connected to the front USB port of the NAS) is being accessed 4. The data is being copied to or from the external USB or eSATA device
		Blue	A front USB device is detected (after the device is mounted)
		Off	1. No USB device is detected 2. The NAS has finished copying the data to or from the USB device connected to the front USB port
eSATA[2]	Orange	Flashes	The eSATA device is being accessed
		Off	No eSATA device can be detected

[1] The 10 GbE network expansion function is only supported by the TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-1279U-RP, TS-EC879U-RP, TS-EC1279U-RP, TS-1679U-RP, TS-EC1679U-RP, TS-870U-RP, and TS-1270U-RP.
[2] TS-219, TS-212 do not support eSATA port.

Beep alarm: All NAS models

The beep alarm can be disabled in "System Administration" > "Hardware Settings".

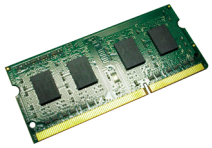
Beep sound	Number of Times	Description
Short beep (0.5 sec)	1	1. The NAS is starting up. 2. The NAS is being shut down (software shutdown). 3. The user presses the reset button to reset the NAS. 4. The system firmware has been updated.
Short beep (0.5 sec)	3	The user tries to copy the NAS data to the external storage device from the front USB port, but the data cannot be copied.
Long beep (1.5 sec)	3, every 5 min	The system fan is out of function.
Long beep (1.5 sec)	2	1. The disk volume is going to be full. 2. The disk volume has reached its full capacity. 3. The hard drives on the NAS are in degraded mode. 4. The user starts the hard drive rebuilding process. 5. A hard drive is plugged in or out.
	1	1. The NAS is turned off by force shutdown (hardware shutdown). 2. The NAS has been turned on successfully and is ready.

Chapter 5. Upgrade Memory on QNAP Turbo NAS (RAM Module Installation)

Warning:

- The following instructions should only be performed by an authorized and trained technician.
- Strictly adhere to the instructions to install a RAM module on the NAS. Failure to do so could result in injury to human body or death.

QNAP provides 1GB/2GB DDR3 RAM module (optional purchase) for users to upgrade the memory of Turbo NAS. Follow the steps below to install an extra memory module on the NAS to upgrade the memory.



5.1 TS-x59 Pro II series (4/5/6-bay), TS-x69 series (2/4/5/6/8-bay)

Follow the steps below to install a RAM module on the NAS.

1. Turn off the NAS. Disconnect the power adaptor, network cable(s), and any other connectors or cables from the NAS.

2. Before installing the memory module, put on an antistatic wrist strap to prevent electrostatic discharge. The crocodile clip should be connected to the ground.

3. Loosen the three screws on the rear of the NAS.

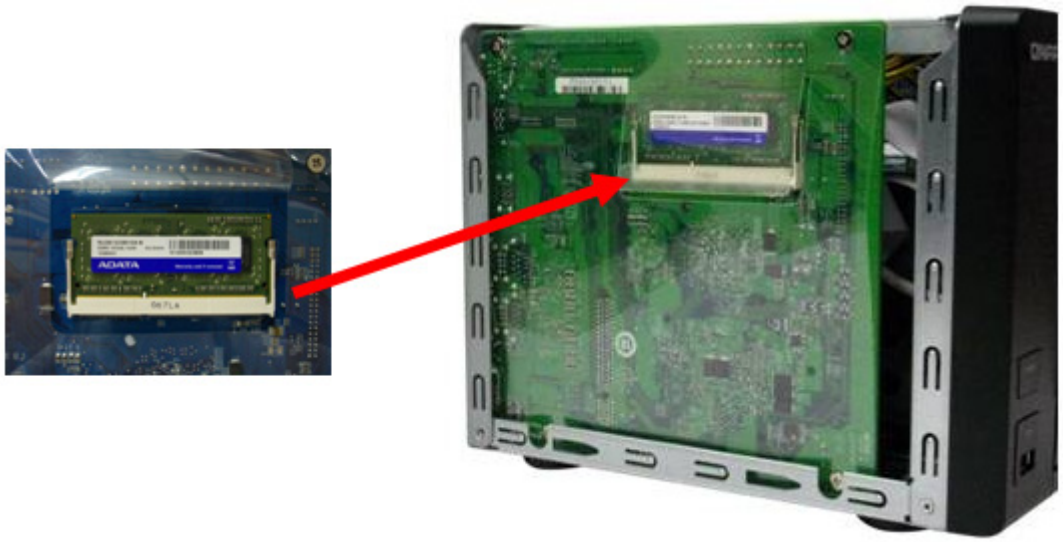
4. Remove the case cover of the NAS gently.

5. Lift up the Mylar sheet. Locate the memory slot. Make sure the slot is empty.

6. Grasp the edge of the memory module. Align the notch on the gold edge of the module with the notch in the memory slot. Slide the memory module to the slot at a 45-degree angle (approximately).

7. Gently press the memory module into the slot until it is seated fully.

8. Rotate the memory module towards the motherboard until the securing clips clicks into place.



9. Close the case cover and fasten the screws. Connect the power adaptor and cables back to the NAS.

10. To check that the memory module is recognized by the NAS, power up the NAS and login the web interface as an administrator. Go to “System Status” > “System Information” and check the total memory in “Hardware Information”.

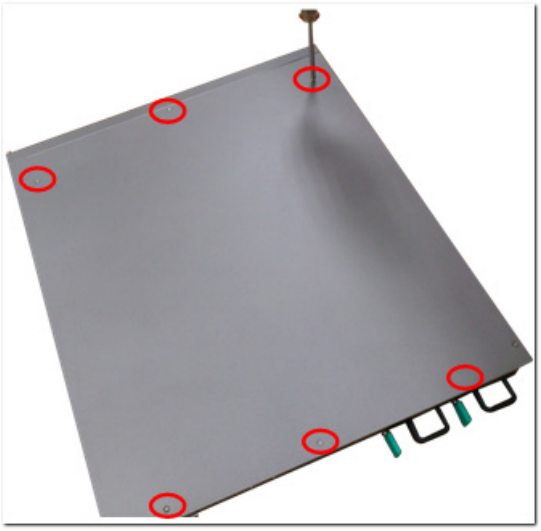
5.2 TS-x69U-RP/SP series (4/8/12-bay)

Follow the steps below to install a RAM module on the NAS.

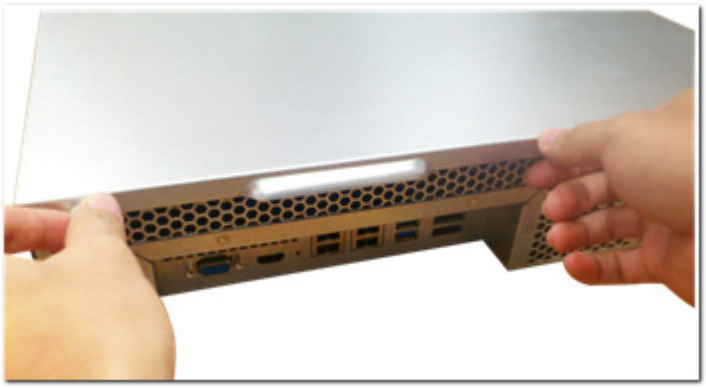
1. Turn off the NAS. Disconnect the power adaptor, network cable(s), and any other connectors or cables from the NAS.

2. Before installing the memory module, put on an antistatic wrist strap to prevent electrostatic discharge. The crocodile clip should be connected to the ground.

3. Open the NAS.
   a. TS-469U-RP/SP: Loosen the six screws on the top of the NAS.

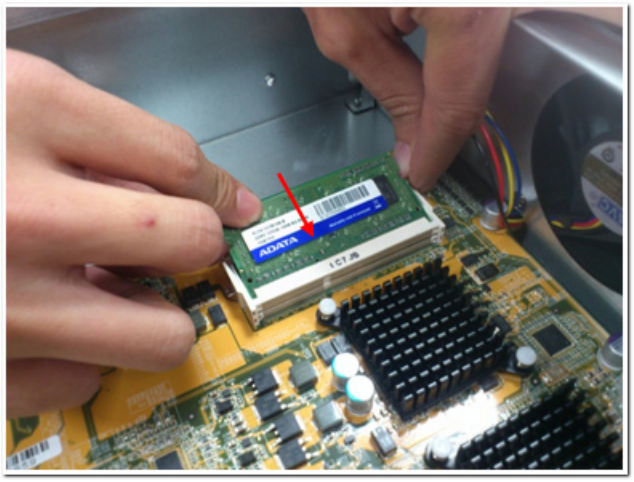


   b. TS-869U-RP and TS-1269U-RP: Loosen the two screws on the rear of the NAS.

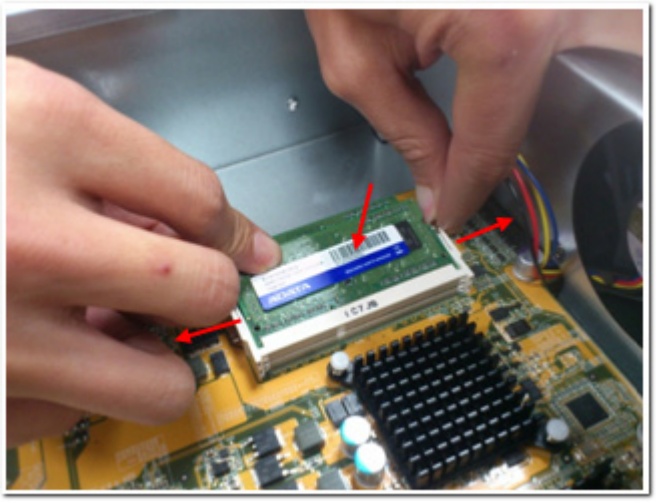


4. Open the NAS.

5. Slide the memory module to the slot at a 45-degree angle (approximately).



6. Press the memory module down while holding the clips open.

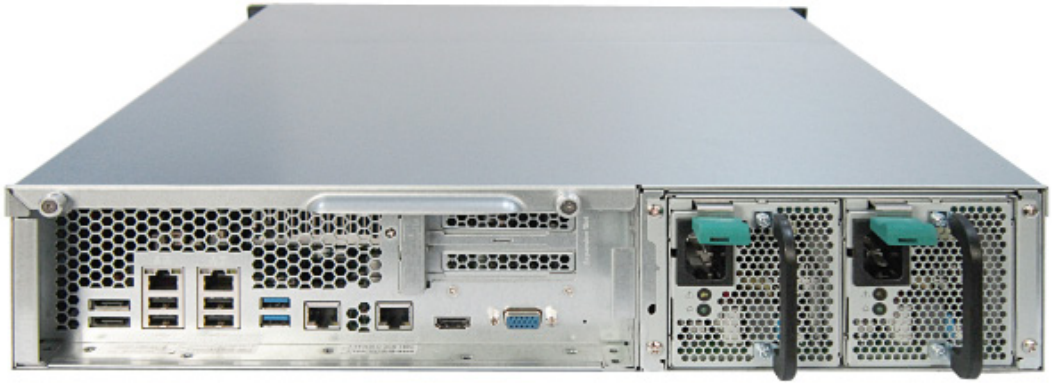


7. Make sure the memory module sits in properly with the clips in place.

8. Close the NAS cover and fasten the screws. Connect the power adaptor and cables back to the NAS.

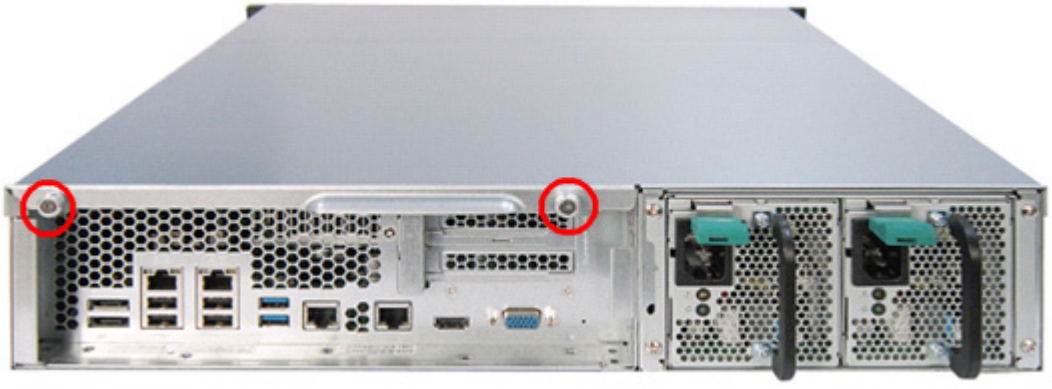
5.3 TS-879U-RP, TS-1279U-RP, TS-EC879U-RP, TS-EC1279U-RP, TS-1679U-RP, TS-EC1679U-RP, TS-870U-RP, TS-1270U-RP

QNAP provides a 4GB DDR3* RAM module and a 4GB DDR3 ECC** RAM module (optional purchase) for users to upgrade the memory of the NAS. Insert an extra RAM module on the motherboard of the NAS to upgrade the memory. The total memory will be shown in "System Information" of the administration page.

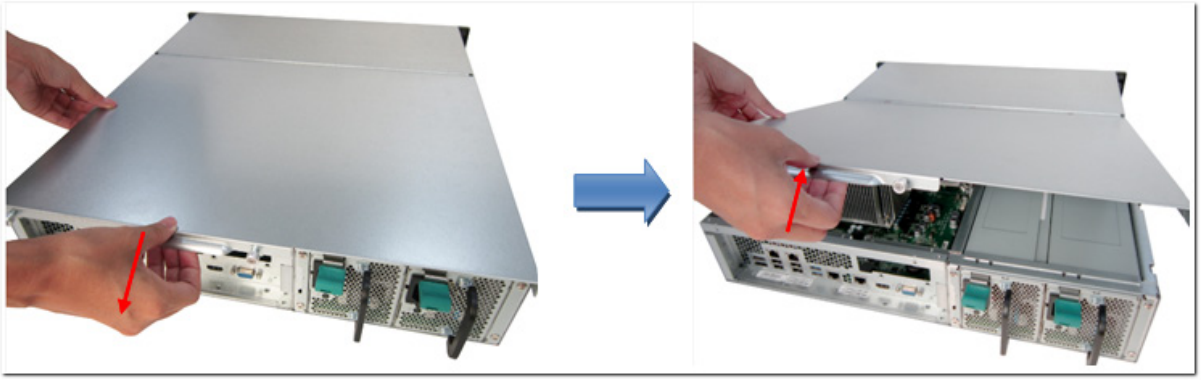


*Applied models: TS-879U-RP, TS-1279U-RP, TS-1679U-RP, TS-870U-RP, TS-1270U-RP.
**Applied models: TS-EC879U-RP, TS-EC1279U-RP, TS-EC1679U-RP.

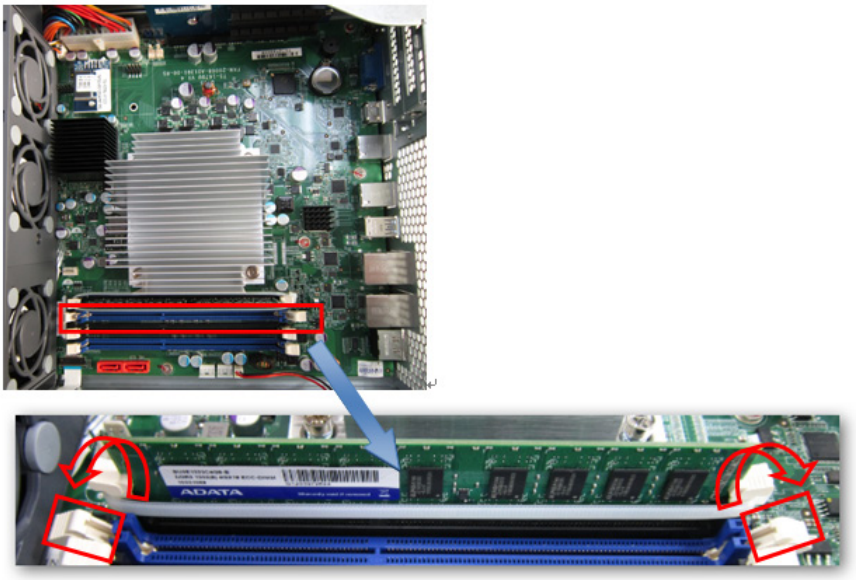
1. Loosen the 2 screws on the rear of the NAS as shown in the illustration.



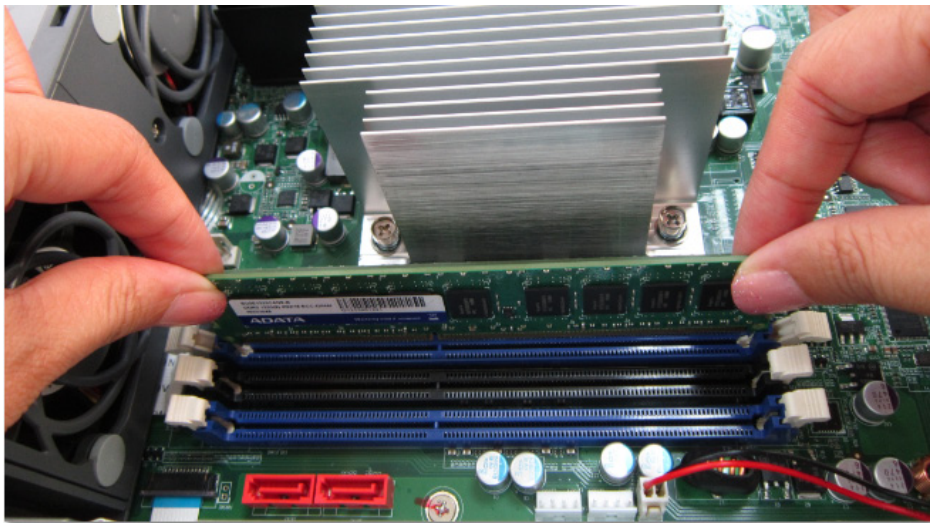
2. Hold the notch at the edge of the top cover. Remove the top cover in both hands.



3. Release the ejector clips gently by pulling them out of the sides of the RAM slot.



4. Grasp the edge of the RAM module. Align the notch on the gold edge of the RAM module with the notch in the RAM slot. Insert the RAM module to the RAM slot until it cannot go any further.



Chapter 6. Network Expansion Card Installation

Warning:

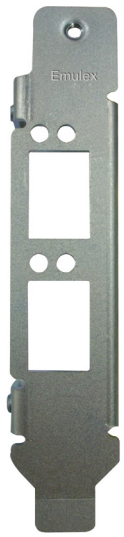
- The following instructions should only be performed by an authorized and trained technician.
- Strictly adhere to the instructions to install a network expansion card on the NAS. Failure to do so could result in injury to human body or death.

The TS-x79 Pro series provides expansion slots for network expansion. Insert an extra network expansion card (optional purchase) to the motherboard of the NAS to increase the network bandwidth.

6.1 TS-879 Pro, TS-1079 Pro

Please refer the compatibility table below and replace a proper bracket for the network expansion card.

Bracket A	Bracket B



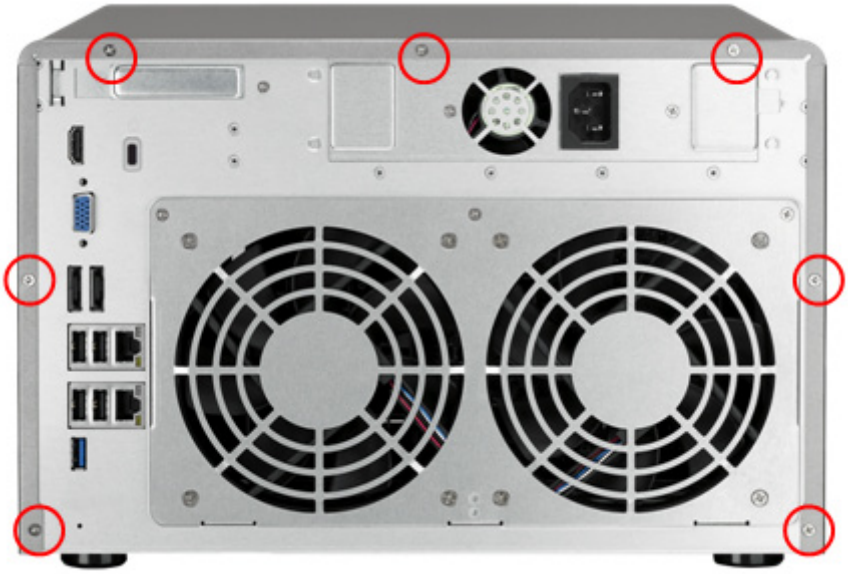
Bracket C

	Network Expansion Card Compatibility
Bracket A (X520-T2)	Intel® Ethernet Server Adapter X520-T2 (E10G42B)
Bracket B (X520-SR2/X520-DA2)	1. Intel® Ethernet Server Adapter X520-SR2 (E10G42BFSR) 2. Intel® Ethernet Server Adapter X520-DA2 (E10G42BTDA)
Bracket C (Emulex)	1. Emulex OneConnect 10GbE Network Adapters, SFP+ Direct attach copper (OCe11102-NX) 2. Emulex OneConnect 10GbE Network Adapters, Short reach optical (OCe11102-NM) 3. Emulex OneConnect 10GbE Network Adapters, SFP+ Direct attach copper (OCe11102-IX) 4. Emulex OneConnect 10GbE Network Adapters, Short reach optical (OCe11102-IM)

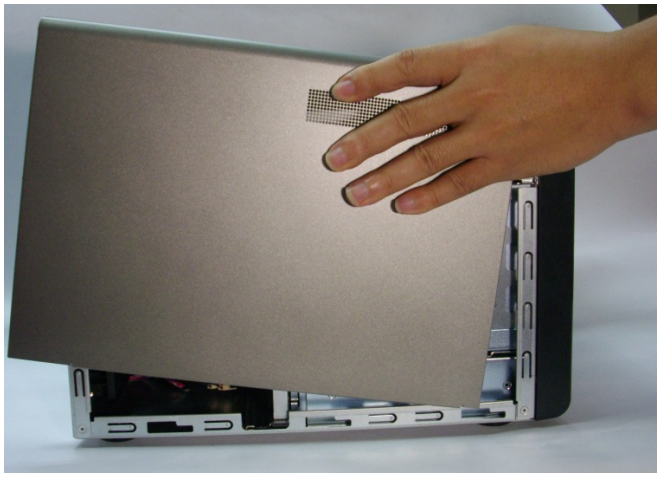
1. Turn off the NAS. Disconnect the power adaptor, network cable(s), and any other connectors or cables from the NAS.

2. Before installing the network expansion card, put on an antistatic wrist strap to prevent electrostatic discharge. The crocodile clip should be connected to the ground.

3. Loosen the seven screws on the rear of the NAS.

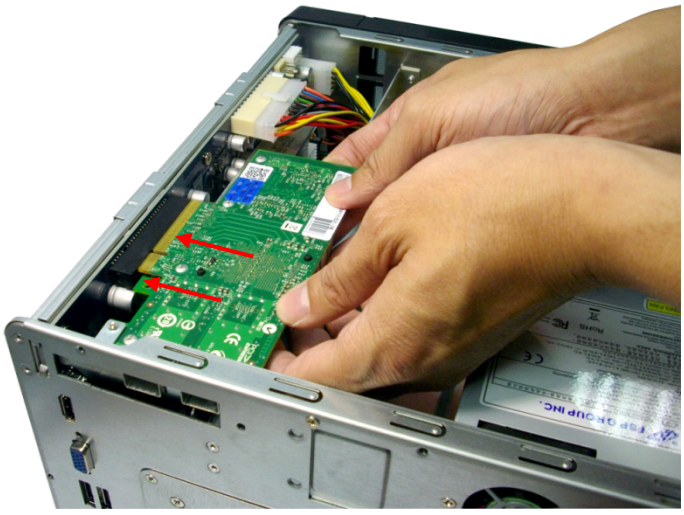


4. Remove the case cover of the NAS gently.

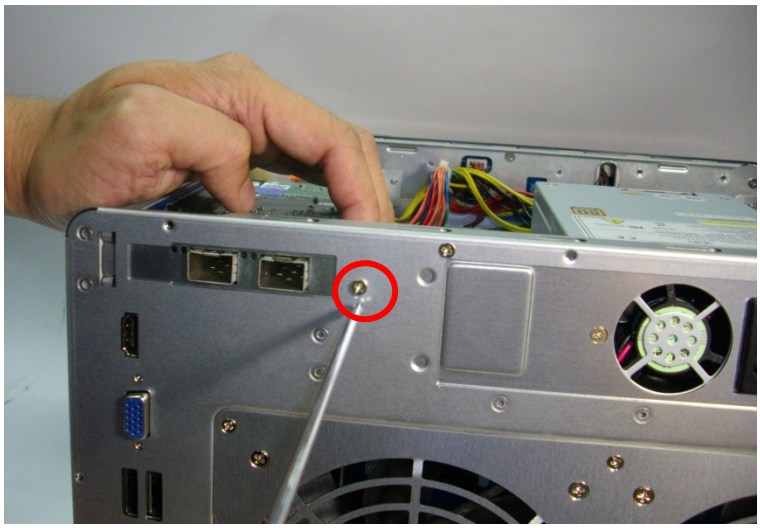


5. Loosen the screws and remove the expansion slot cover.

6. Grasp the edge of the network expansion card. Align the notch on the gold edge of the card with the notch in the PCIe slot. Insert the network expansion card to the PCIe slot until it cannot go any further.



7. Fasten the screws.



8. Close the case cover and fasten the screws. Connect the power adaptor and cables to the NAS.

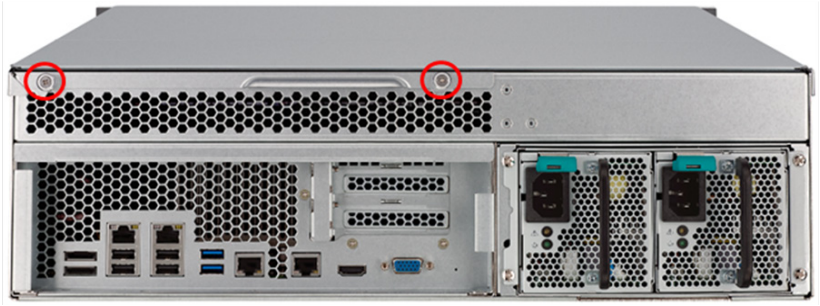
9. To check that the network expansion is recognized by the NAS, power up the NAS and login the web interface as an administrator. Go to "System Administration" > "Network" > "TCP/IP" and check the total number of network interfaces.

6.2 TS-879U-RP, TS-EC879U-RP, TS-1279U-RP, TS-EC1279U-RP, TS-1679U-RP, TS-EC1679U-RP

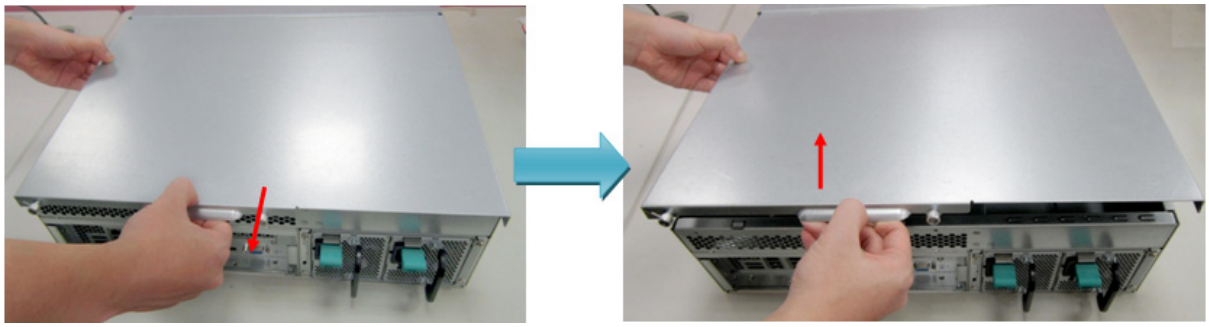
1. Turn off the NAS. Disconnect the power adaptor, network cable(s), and any other connectors or cables from the NAS.

2. Before installing the network expansion card, put on an antistatic wrist strap to prevent electrostatic discharge. The crocodile clip should be connected to the ground.

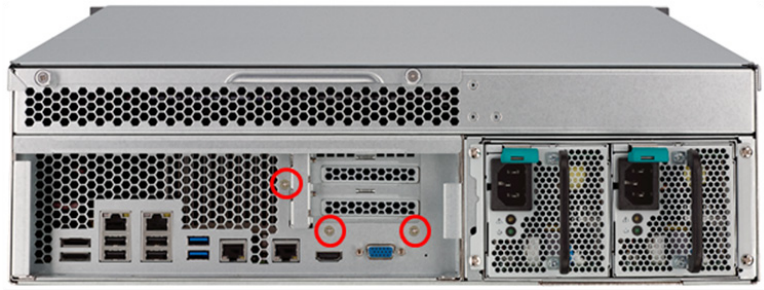
3. Loosen the 2 screws on the rear of the NAS as shown in the illustration.

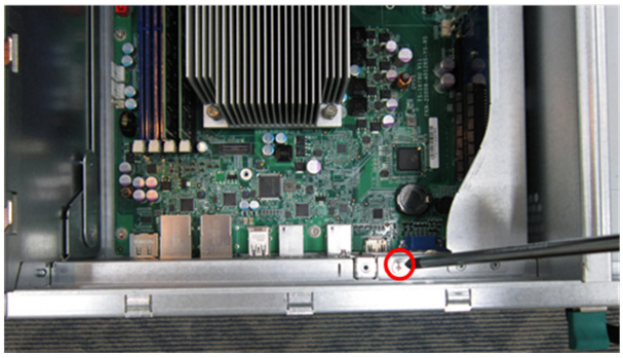


4. Hold the notch at the edge of the top cover. Remove the top cover in both hands.

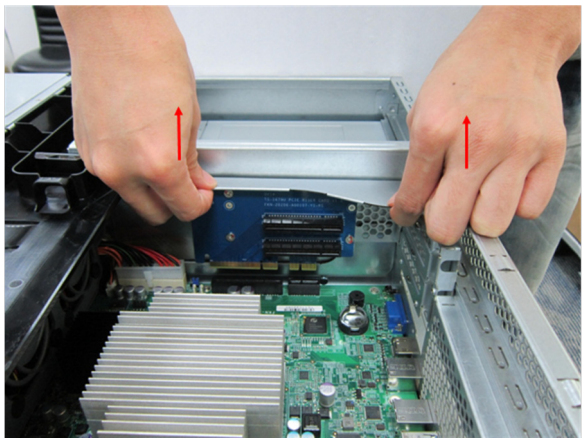


5. Loosen the 4 screws as shown in the illustration.

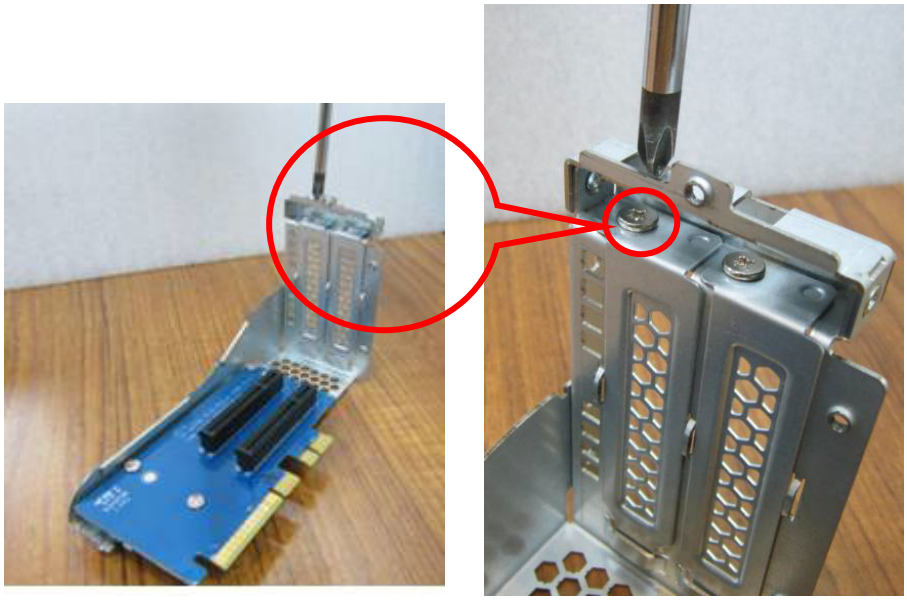




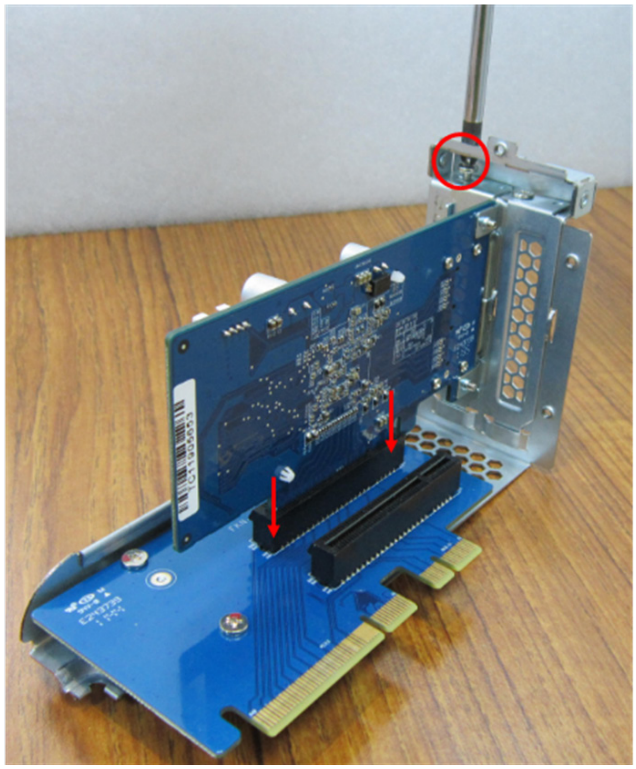
6. Grasp the metal edge of the riser card module. Remove the module gently.



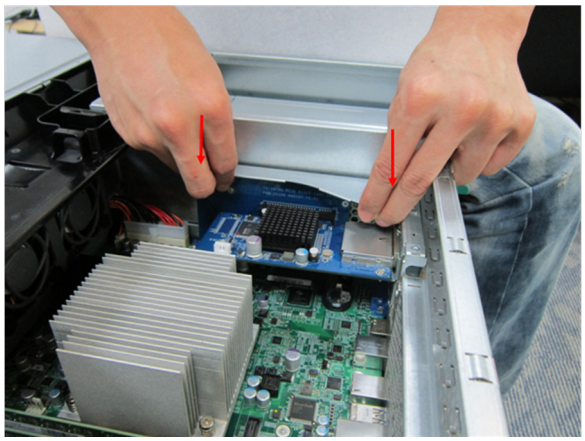
7. Loosen the screw and remove the expansion slot cover.



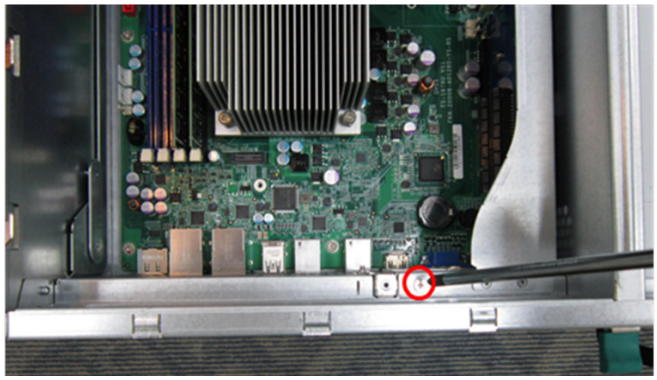
8. Insert the network expansion card to the PCIe slot until it cannot go any further. Then fasten the screw.

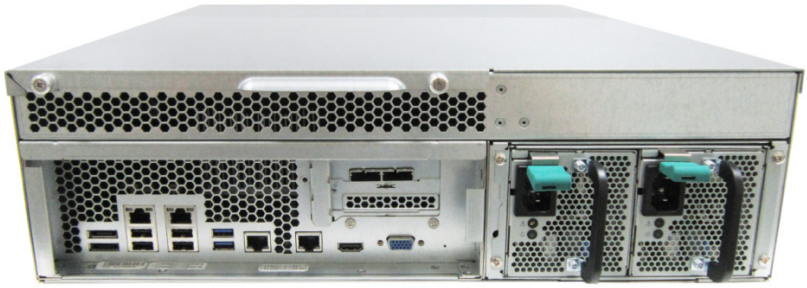


9. Grasp the metal edge of the riser card module. Align the notch on the gold edge of the riser card with the notch in the PCIe slot. Insert the riser card module to the PCIe slot until it cannot go any further.



10. Fasten the screws. Close the case cover and fasten the screws.





11. Connect the power adaptor and cables to the NAS.

12. To check that the network expansion is recognized by the NAS, power up the NAS and login the web interface as an administrator. Go to “System Administration” > “Network” > “TCP/IP” and check the total number of network interfaces.

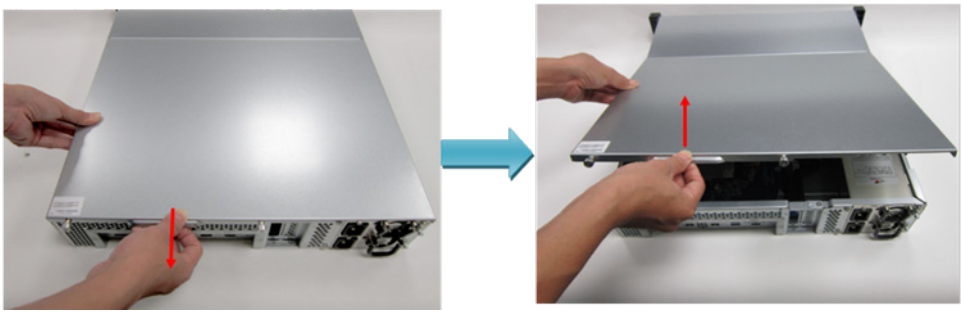
6.3 TS-870U-RP, TS-1270U-RP

1. Turn off the NAS. Disconnect the power adaptor, network cable(s), and any other connectors or cables from the NAS.

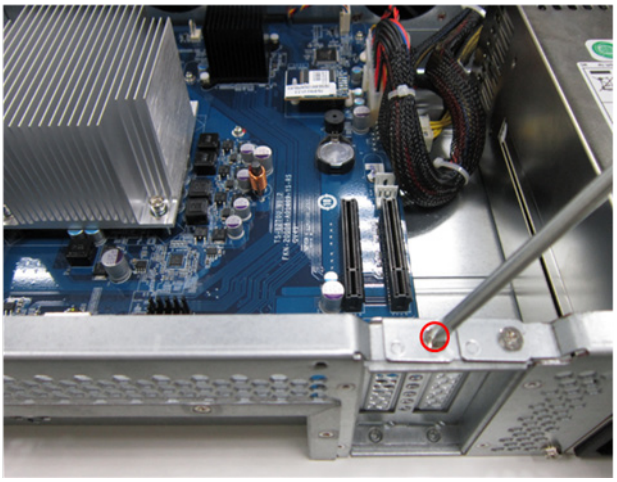
2. Before installing the network expansion card, put on an antistatic wrist strap to prevent electrostatic discharge. The crocodile clip should be connected to the ground.

3. Loosen the two screws on the rear of the NAS.

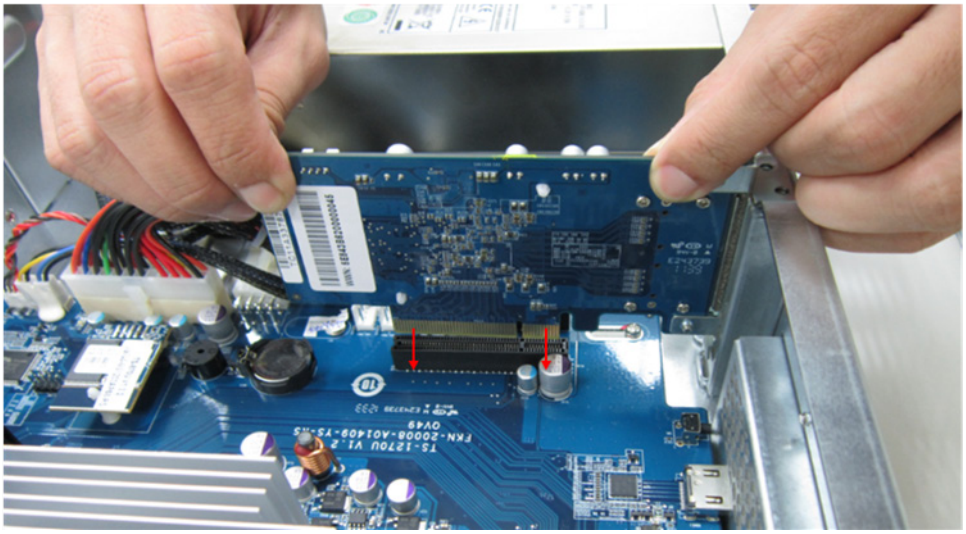
4. Hold the notch at the edge of the top cover. Remove the top cover in both hands.



5. Loosen the screw and remove the expansion slot cover.



6. Grasp the edge of the expansion card. Align the notch on the gold edge of the card with the notch in the PCIe slot. Insert the network expansion card to the PCIe slot until it cannot go any further.



7. Fasten the screws.

8. Close the case cover and fasten the screws. Connect the power adaptor and cables to the NAS.

9. To check that the network expansion is recognized by the NAS, power up the NAS and login the web interface as an administrator. Go to “System Administration” > “Network” > “TCP/IP” and check the total number of network interfaces.

Chapter 7. Hot-swap Hard Drives

The QNAP NAS is compatible with 2.5-inch/3.5-inch SATA hard disk drives from major hard disk brands. For the updated hard drive compatibility list, please visit http://www.qnap.com.

Caution:

- QNAP disclaims any responsibility for product damage/malfunction or data loss/recovery due to misuse or improper installation of hard disks in any occasions for any reasons.
- Note that if a hard drive (new or used) which has never been installed on the NAS before is installed, the hard drive will be formatted and partitioned automatically and all the disk data will be cleared.

System	Supports 3.5-inch SATA Hard Drives	Supports 2.5-inch SATA Hard Drives	Supports SSD	Supports Hot-swapping Hard Drives (RAID 1 or above only)
TS-112, TS-212	Yes	No	No	No
TS-119P II	Yes	Yes	Yes	No
TS-219	Yes	No	No	Yes
TS-219P II, TS-419P II, TS-419U II, TS-412, TS-412U, TS-459 Pro II, TS-879 Pro, TS-1079 Pro, TS-879U-RP, TS-1279U-RP, TS-EC879U-RP, TS-EC1279U-RP, TS-1679U-RP, TS-EC1679U-RP, TS-269 Pro, TS-469 Pro, TS-569 Pro, TS-669 Pro, TS-869 Pro, TS-469U-RP/SP, TS-869U-RP, TS-1269U-RP,	Yes	Yes	Yes	Yes

TS-269L, TS-469L, TS-569L, TS-669L, TS-869L, TS-870U-RP, TS-1270U-RP				

The NAS supports hot-swapping the hard drives when 1 member drive crashes in RAID 1, 1–2 member drives crash in RAID 5 or RAID 6. Follow the steps below to hot-swap the hard drive when a member drive fails in a RAID configuration.

1. Login the NAS and check the disk volume configuration in "Volume Management".
2. The volume status should be "in degraded mode".
3. Prepare a new hard drive to replace the failed one. The capacity of the new hard drive should be the same as or larger than the failed hard drive.
4. Unplug the failed drive from the NAS. Wait for about 20 seconds or until the server beeps twice.
5. Remove the failed drive from the drive tray.
6. Install the new hard drive on the drive tray. Insert it to the NAS.
7. The server should beep 1.5 seconds twice.
8. Check the volume status on the web administration page. The volume should be rebuilding.

Warning: Users are strongly recommended to turn OFF the server before replacing the hard drive to reduce the risk of electric shock.

Chapter 8. RAID Recovery

The QNAP NAS supports exclusive RAID recovery technology to recover a failed RAID disk volume from unintentional disconnection or removal of the hard drives from the system. Using the RAID recovery, users can recover an inactive RAID 1, RAID 5, or RAID 6 volume to degraded mode, or an inactive RAID 0 and JBOD configuration to normal.

Disk volume	**Supports RAID recovery**	**Maximum number of disk removal allowed**
Single	No	-
JBOD	Yes	1 or more
RAID 0	Yes	1 or more
RAID 1	Yes	1 or 2
RAID 5	Yes	2 or more
RAID 6	Yes	3 or more
RAID 10	No	-

If the volume status is not active, users can install the same hard drives back to the same slots of the NAS. Then click "RECOVER" on the "Disk Management" > "Volume Management" page. Wait for about 60 seconds for the process to complete. When finished, the data can be accessed.

Note:

- ✓ After recovering a RAID 1, RAID 5, or RAID 6 disk volume from not active to degraded mode by the RAID recovery, users can read or write the volume normally. The volume status will be recovered to normal after synchronization.
- ✓ If the disconnected drive member is damaged, the RAID recovery function will not work.

	Standard RAID 5	**QNAP RAID 5**	**Standard RAID 6**	**QNAP RAID 6**
Degraded mode	N-1	N-1	N-1 & N-2	N-1 & N-2
Read only protection (for immediate data backup & hard drive replacement)	N/A	N-1, bad blocks found in the surviving drives of the array.	N/A	N-2, bad blocks found in the surviving drives of the array.
RAID recovery (RAID status: Not active)	N/A	If re-inserting all the original hard disk drives to the NAS and they can be spun up, identified, accessed, and the hard drive superblock is not damaged.	N/A	If re-inserting all the original hard disk drives to the NAS and they can be spun up, identified, accessed, and the hard drive superblock is not damaged).
RAID crash	N-2	N-2 failed hard drive and any of the remaining hard drives cannot be spun up or identified or accessed.	N-3	N-3 and any of the remaining hard drives cannot be spun up or identified or accessed.

N = Number of hard disk drives in the array

Chapter 9. Use the LCD Panel

This feature is only provided by the NAS models with LCD panels. Please visit http://www.qnap.com for details.

The NAS provides a handy LCD panel for users to perform disk configuration and view the system information.

When the NAS has started up, the server name and IP address will be shown.

For the first time installation, the LCD panel shows the number of hard drives detected and the IP address. Configure the hard drives.

Number of hard drives detected	**Default disk configuration**	**Available disk configuration options***
1	Single	Single
2	RAID 1	Single -> JBOD ->RAID 0 -> RAID 1
3	RAID 5	Single -> JBOD -> RAID 0 -> RAID 5
4 or above	RAID 5	Single ->JBOD -> RAID 0 -> RAID 5 -> RAID 6

*Press the "Select" button to choose the option, and press the "Enter" button to confirm.

For example, when 5 hard drives installed are available on the NAS, the LCD panel shows:

Press the "Select" button to browse more options, for example, RAID 6.
Press the "Enter" button and the following message shows. Press the "Select" button to select "Yes" to confirm.

When RAID 1, RAID 5, or RAID 6 configuration is executed, the system will initialize the hard drives, create the RAID device, format the RAID device, and mount it as a volume on the NAS. The progress will be shown on the LCD panel. When it reaches 100%, the RAID volume can be accessed. Users can create share folders and upload files to the folders on the NAS. In the meantime, to make sure the stripes and blocks in all the RAID component devices are ready, the NAS will execute RAID synchronization and the progress will be shown on "Disk Management" > "Volume Management" page. The synchronization rate is around 30–60 MB/s (vary by hard drive models, system resource usage, etc.).

Note: If a member drive of the RAID configuration was lost during the synchronization, the RAID device will enter degraded mode. The volume data is still accessible. If a new member drive is added, the NAS will start to rebuild. The status can be checked on the "Volume Management" page.

To encrypt the disk volume*, select "Yes" when the LCD panel shows <Encrypt Volume?>. The default encryption password is "admin". To change the password, please login the web-based administration interface as an administrator and change the settings in "Device Configuration" > "Disk volume Encryption Management".

When the configuration is finished, the server name and IP address will be shown. If the NAS fails to create the disk volume, the following message will be shown.

*This feature is not supported by TS-219, TS-119P II, TS-219P II, TS-419P II, TS-419U II, TS-112, TS-212, TS-412, TS-412U.

The data encryption functions may not be available in accordance to the legislative restrictions of some countries.

View system information by the LCD panel

When the LCD panel shows the server name and IP address, press the "Enter" button to enter the Main Menu. The Main Menu consists of the following items:

1. TCP/IP
2. Physical disk
3. Volume
4. System
5. Shut down
6. Reboot
7. Password
8. Back

1. TCP/IP

The following options are available:

- LAN1 IP Address
- LAN1 Subnet Mask
- LAN1 Gateway
- LAN 1 PRI. DNS
- LAN 1 SEC. DNS
- Enter Network Settings
  - ✓ Network Settings – DHCP
  - ✓ Network Settings – Static IP*
  - ✓ Network Settings – BACK
- Back to Main Menu

* In Network Settings – Static IP, users can configure the IP address, subnet mask, gateway, and DNS of LAN 1 and LAN 2.

2. Physical disk

The following options are available:

- Disk Info
- Back to Main Menu

The disk info shows the temperature and the capacity of the hard drive.

3. Volume

This section shows the disk configuration of the NAS. The first line shows the RAID configuration and storage capacity; the second line shows the member drive number of the configuration.

If there is more than one volume, press the "Select" button to view the information. The following table shows the description of the LCD messages for RAID 5 configuration.

LCD Display	Drive configuration
RAID5+S	RAID5+spare
RAID5 (D)	RAID 5 degraded mode
RAID 5 (B)	RAID 5 rebuilding
RAID 5 (S)	RAID 5 re-synchronizing
RAID 5 (U)	RAID 5 is unmounted
RAID 5 (X)	RAID 5 non-activated

4. System

This section shows the system temperature and the rotation speed of the system fan.

5. Shut down

Use this option to turn off the NAS. Press the "Select" button to select "Yes". Then press the "Enter" button to confirm.

6. Reboot

Use this option to restart the NAS. Press the "Select" button to select "Yes". Then press the "Enter" button to confirm.

7. Password

The default password of the LCD panel is blank. Enter this option to change the password of the LCD panel. Select "Yes" to continue.

Enter a password of maximum 8 numeric characters (0-9). When the cursor moves to "OK", press the "Enter" button. Verify the password to confirm the changes.

8. Back

Select this option to return to the main menu.

System Messages

When the NAS encounters system error, an error message will be shown on the LCD panel. Press the "Enter" button to view the message. Press the "Enter" button again to view the next message.

System Message	Description
Sys. Fan Failed	The system fan fails
Sys. Overheat	The system overheats
HDD Overheat	The hard drive overheats
CPU Overheat	The CPU overheats
Network Lost	Both LAN 1 and LAN 2 are disconnected in failover or load-balancing mode
LAN1 Lost	LAN 1 is disconnected
LAN2 Lost	LAN 2 is disconnected
HDD Failure	The hard drive fails
Vol1 Full	The volume is full
HDD Ejected	The hard drive is ejected
Vol1 Degraded	The volume is in degraded mode
Vol1 Unmounted	The volume is unmounted
Vol1 Nonactivate	The volume is not activated

Chapter 10. Install Power Supply Unit

* This section applies to rackmount NAS models only. The power supply units of TS-879U-RP, TS-EC879U-RP, TS-469U-RP/SP, TS-869U-RP, and TS-1269U-RP should only be replaced by an authorized and trained technician.

10.1 1U Turbo NAS

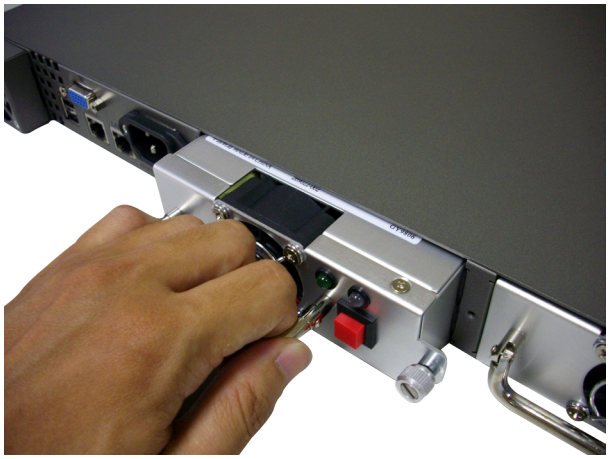
The following instructions should only be performed by an authorized and trained technician.

To install a redundant power supply unit to the 1U Turbo NAS, follow the steps below.

1. Turn off the NAS.

2. Remove the screw and dummy plate.

3. Insert the power supply unit and push it to the end.



4. Fasten the screw tightly.

5. Turn on the NAS.

Note: To replace a failed power supply unit, turn off the NAS. Then remove the failed unit safely and repeat steps 3-5 above to install a new power supply unit.

10.2 TS-469U-RP/SP

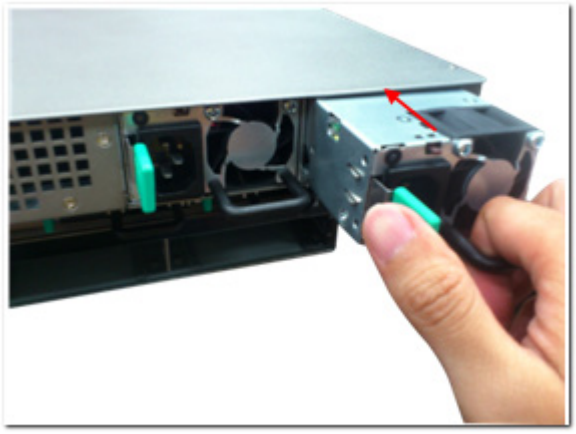
The following instructions should only be performed by an authorized and trained technician.

Follow the steps below to replace a failed power supply unit on the TS-469U-RP/SP.

1. Turn off the NAS.

2. Press the green lever and remove the defective power supply unit.

3. Insert a new power supply unit and push it to the end.



4. Turn on the NAS.

Warning: The NAS supports replacing the redundant power supply unit without turning off the server when redundant power supply mode is enabled. However, users are strongly recommended to turn OFF the NAS before replacing the power supply unit to reduce the risk of electric shock.

A second power supply unit can be installed on a single power (SP) rackmount NAS model to upgrade the SP model to redundant power (RP) model.

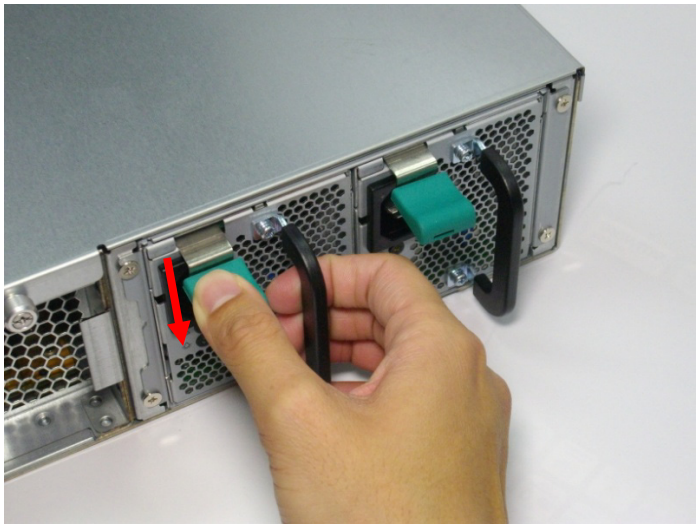
10.3 2U/3U Turbo NAS (TS-1279U-RP, TS-EC1279U-RP, TS-1679U-RP, and TS-EC1679U-RP only)

The following instructions should only be performed by an authorized and trained technician.

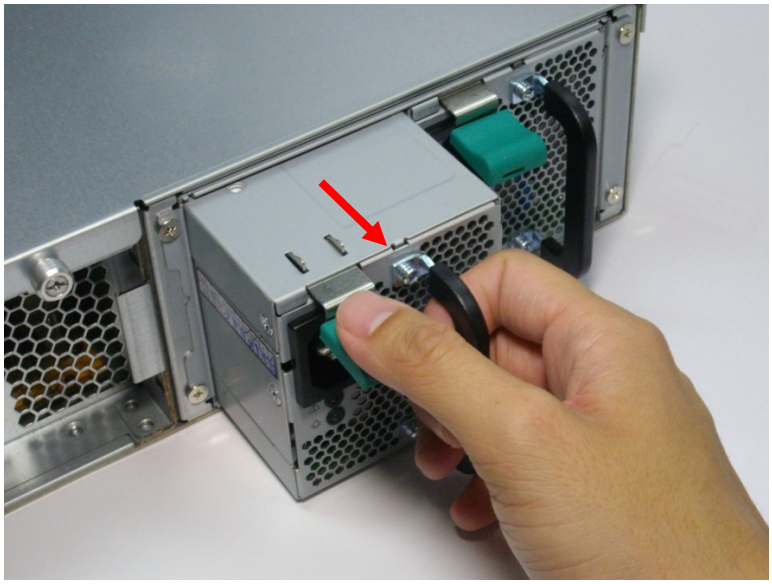
To replace a failed power supply unit on the TS-1279U-RP, TS-EC1279U-RP, TS-1679U-RP or TS-EC1679U-RP Turbo NAS, follow the steps below.

1. Turn off the NAS.

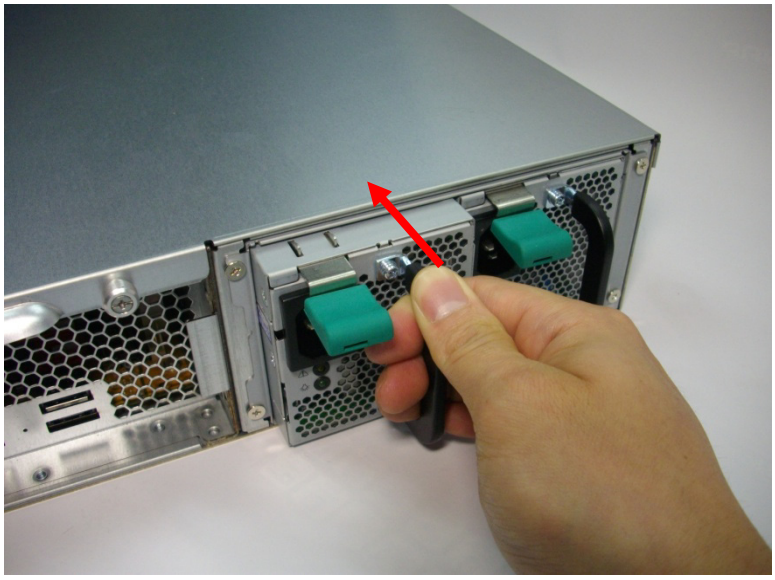
2. Hold the black handler and press and hold the green button firmly.



3. Unplug the failed power supply.



4. Plug in a new power supply to the NAS.



5. Turn on the NAS.

10.4 2U Turbo NAS (except TS-1279U-RP and TS-EC1279U-RP)

The following instructions should only be performed by an authorized and trained technician.

To replace a failed power supply unit on a 2U Turbo NAS, follow the steps below.

1. Turn off the NAS.

2. Unfasten the screw on the failed power supply in an anticlockwise direction.

3. Unplug the failed power supply.

4. Plug in the new power supply to the NAS.

5. Fasten the screw on the power supply in clockwise direction.

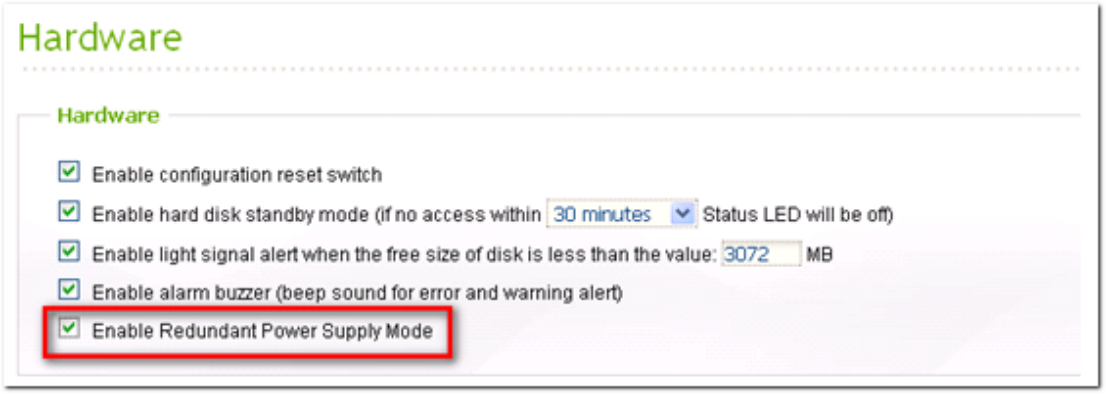
6. Turn on the NAS.

Enable warning alert for redundant power supply on the web-based interface:

If two power supply units (PSU) have been installed on the NAS and connected to the power sockets, both PSU will supply the power to the NAS (applied to 1U and 2U models). Users can enable redundant power supply mode in "System Administration" > "Hardware" to receive warning alert for the redundant power supply. The NAS will beep and record the error messages in "System Logs" when the PSU is plugged out or fails.

If only one PSU is installed on the NAS, users are suggested NOT to enable this option.

* This function is disabled by default.


Hardware
Hardware
Enable configuration reset switch
Enable hard disk standby mode (if no access within 30 minutes Status LED will be off)
Enable light signal alert when the free size of disk is less than the value: 3072 MB
Enable alarm buzzer (beep sound for error and warning alert)
Enable Redundant Power Supply Mode

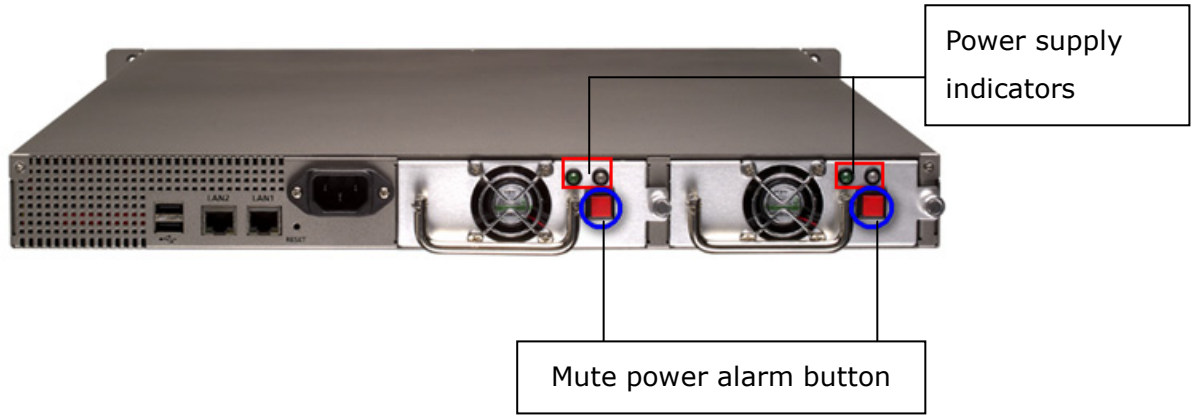
The following description applies to 1U NAS models only.

(1) Power supply indicators:

- ✓ Green (left) power indicator: Indicates the power supply unit is in normal status.
- ✓ Red (right) power indicator: Indicates the power supply unit is in abnormal status.

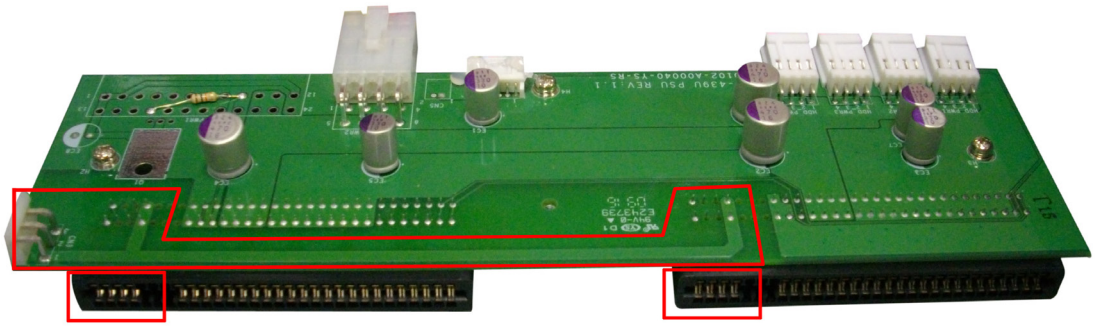
(2) Mute power alarm button:

When an error is detected on power supply unit, the system beeps to alert the administrator. Press this button to turn off the alarm.



WARNING: RISK OF ELECTRIC SHOCK

The connectors on the back panel (bracketed parts below) contain high voltage. Do NOT touch these parts to avoid the risk of electric shock to the maintenance operator.



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Technical Support in the USA and Canada:
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TEL: +1-909-595-2782
Address: 168 University Parkway, Pomona CA 91768
Service Hours: 08:00-17:00 (GMT- 08:00 Pacific Time, Monday to Friday)

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Version 3, 29 June 2007

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